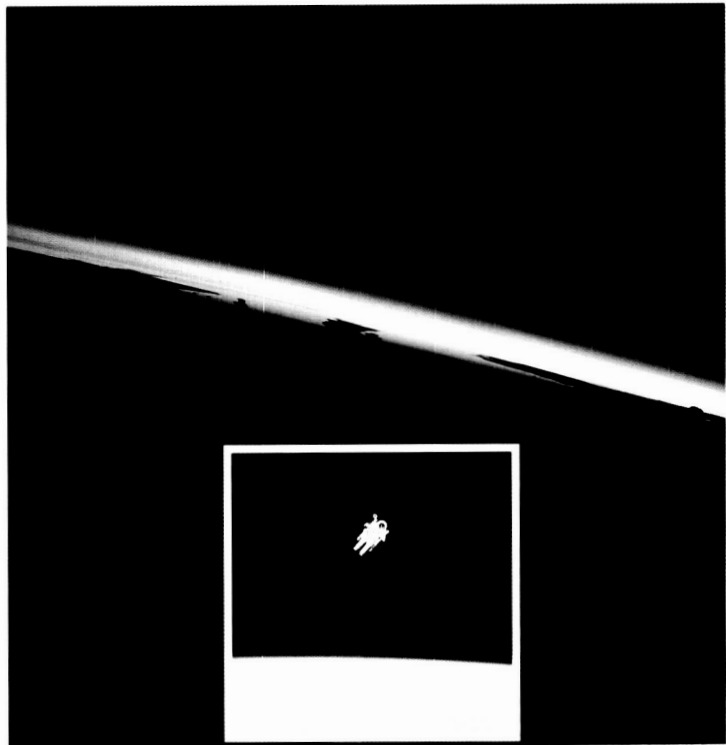

Strategies for Revitalizing Organizations:

Regaining the Competitive Edge



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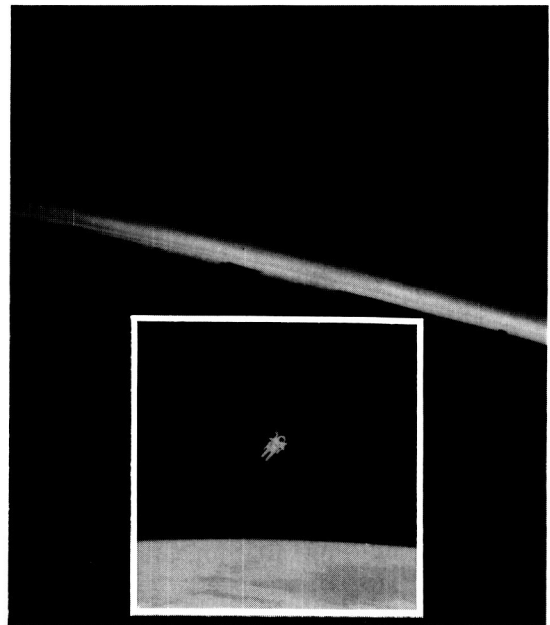
Report from the Second NASA Symposium on Quality and Productivity

ORIGINAL CONTENTS
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Strategies for Revitalizing Organizations:

Regaining the Competitive Edge

The Office of NASA Productivity Programs



August 1987

NASA
National Aeronautics and
Space Administration

Report from the Second NASA Symposium on Quality and Productivity

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Message From the NASA Administrator

Almost three years ago, NASA sponsored its first National Symposium on Quality and Productivity. Our idea then was to help awaken the Nation to the importance of quality and productivity to our society. I am pleased that our efforts increased national awareness of quality and productivity problems and stimulated government, industry, and academia to work together to solve them. But that was just the beginning. If we are to realize our goal to strengthen the American economy and to strengthen our competitiveness in the world, we must work harder as individuals, as teams, as organizations, and as a Nation. Only then can we out-produce our competitors and keep America on the road to progress and prosperity in the years ahead. As President Reagan said in his State of the Union address, "It is now time to determine that we should enter the next century having achieved a level of excellence unsurpassed in history."

We are living in an age where the single biggest factor affecting productivity may be our ability to properly manage risk. The nations and organizations that can best manage and control risk are the ones that are going to win the productivity race. Managing product reliability and managing people to enable them to do their best are our key challenges in an increasingly competitive, increasingly technological world.

NASA strongly endorses the ideas and concepts contained in this report and we hope that they will be of value to other organizations. At NASA, we are committed to work with our industry partners and supporters, to aspire to excellence in all we do, and in the process, to help America regain its competitive edge.



James C. Fletcher
NASA Administrator



James C. Fletcher
Administrator

August 1987

Foreword

On December 2-3, 1986, NASA sponsored its second national symposium on quality and productivity. "Strategies for Revitalizing Organizations" was the central focus of this symposium which attracted over 1000 executives from industry, government, and academia. Leaders from some of the Nation's most successful organizations spoke on various topics such as, Entrepreneurialism, Measurement and Gainsharing, and Participative Management and the Quality Ethic. Each spoke of a particular approach to attaining success in quality and productivity in his or her organization.

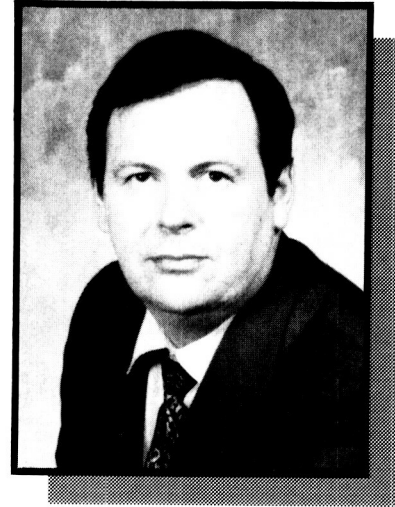
This report summarizes the general conclusions reached at the symposium. It features valuable insights which have applicability beyond just one organization. The ideas go beyond a statement of the problem to an attempt to prescribe solutions. Overriding strategies that came out of this 2-day meeting had to do with the necessity for a cultural change and more focus on the customer's needs. Additionally, the ever-present need for top-level commitment from management was emphasized by many speakers.

In a unique innovation, NASA is attempting to keep in touch with teams of individuals who attended the Symposium by publishing their improvement efforts one year after the event. It is anticipated that this undertaking will help generate the type of healthy atmosphere for improvement which our Nation needs as it meets the competitive challenges in the years ahead.



C. Robert Nysmith
Director
NASA Productivity Programs

August 1987



C. Robert Nysmith

Introduction

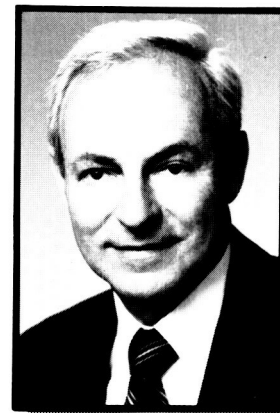
The first NASA Symposium on Quality and Productivity, held in September 1984, presented "a framework for action" to address the challenges the United States faces as a world economic leader. NASA's second national symposium, held on December 2 and 3, 1986, carried forward the dynamic thrust of the first symposium, as leaders from industry, government, and academia met to again consider the challenge of how to substantially improve the quality of America's goods and services and the productivity of its work force. These issues lay at the heart of the stated symposium focus: what strategies are required to revitalize mature organizations? The answers are fundamental and compelling, for only through organizational revitalization can the United States meet the foreign competitive challenge and regain its competitive edge.

The work of analysis and evaluation continues. The themes that emerged from the first symposium served to state the problem and give recommendations for solutions: *"If organizations are to successfully respond to increasing competitive pressure, top management must be actively committed to a quality and productivity ethic. It must then engage the support of all employees through an ongoing process of two-way communications. In order to bring out the energies of employees, management must encourage innovation and risk-taking, eliminate unnecessary controls, and provide positive support for those elements of employee participation that build dedication, pride, and team effort. Organizations must modernize through the development and utilization of new technologies; and, in order to maximize their human potential, they must develop strategies to improve education and training."* During the second Symposium, although the issues remained basically the same, the emphasis had changed. Participants spoke with assurance of what can be achieved and how, using as examples quality and productivity initiatives within their own organizations. Seven strategies emerged from the 1986 Symposium: (1) *Commit to Revitalization*, (2) *Make Quality Integral to Organizational Culture*, (3) *Focus on the Customer*, (4) *Accept and Manage Change*, (5) *Establish a Process to Involve and Recognize Employees*, (6) *Measure Activities to Evaluate Success*, and (7) *Emphasize Education as a Key to the Future*.

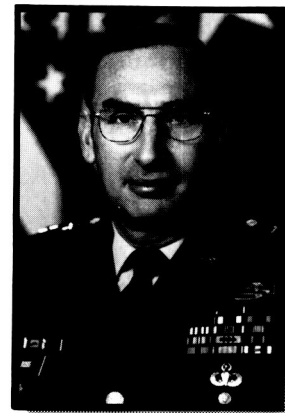
It was clear that in the two years that passed between symposiums, the Nation's management leaders have gained further knowledge, understanding, and insight into the competitiveness issue. The themes surrounding the first symposium have coalesced into viable philosophies; more and more organizations have come to recognize that a commitment to quality and productivity is essential to the future.

"... this whole process of change and revitalization is a continual process rather than a once-in-awhile surge of activity The first thing is the sincerity of the effort. Without a sustained, sincere effort, these programs are not going to succeed." (Daniel M. Tellep, Lockheed Corporation)

"The link between quality and productivity has been clearly and repeatedly demonstrated. Nevertheless, I believe continued emphasis must be given to the quality/productivity interface." (Major General Jimmy D. Ross, U.S. Army)



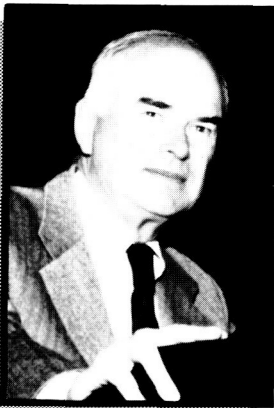
Daniel M. Tellep
Lockheed Corporation



Major General Jimmy D. Ross
U.S. Army Depot System Command



Joseph R. Wright, Jr.
Office of Management and Budget



John C. Bierwirth
Grumman Corporation



James R. Lincicome
Motorola, Inc.

Government is engaged in an ongoing examination of its needs as a customer for industry and of its obligations as an industry partner and a provider of services for the American public. Spurred by President Reagan's 1986 productivity initiative, the Federal Government is also closely examining the way it operates. As Joseph R. Wright, Jr., Deputy Director of the Office of Management and Budget pointed out:

"Government spending is about one-fourth the gross national product of this country and productivity improvements in the Federal Government must keep pace with or exceed those of the private sector."

Examinations of the challenges facing U.S. industry often require a historical context. John C. Bierwirth, Chairman and CEO of the Grumman Corporation, spoke broadly of the evolution of the Nation's competitive problem.

"One of the great advantages of age is that you remember a bit and I can remember back to the Depression years. We were perfectly productive, perfectly competitive in the 1930's. We were taking advantage of the raw materials that we found in the United States. It's hard to remember that we were the world's great oil producer We had an advantage over the rest of the world. We had a very low cost to our agriculture. We didn't have high wages. We were still based on an immigrant society that took advantage of the waves of immigrants that . . . were willing to work at any wage. We were the inventors of mass production In the 1940's, with World War II . . . we switched into a production phase, and began to produce flat out. Whatever we could produce, there was a demand for. And that continued right through into the 1960's and something then began to go wrong . . . we had gotten used to being able to sell whatever we could produce and we paid ourselves well. We had the world's highest standard of living We used to talk about it as if it were a God-given right to all Americans. We paid ourselves well, and the chickens didn't come home to roost until the 1970's."

Forced to acknowledge the dramatic changes that have taken place in the global marketplace, major organizations across the country have engaged in the difficult process of cultural change. Speaker after speaker agreed that the process is slow, for change is hard. That change occurs, however, is essential, for the realities of an increasingly energized and sophisticated world economy have made traditional management approaches outmoded. In the "highly turbulent environment" of the 1980's (Andrew S. Grove, Intel Corporation), only those organizations that can redefine their goals, their strategies, and their commitments will survive.

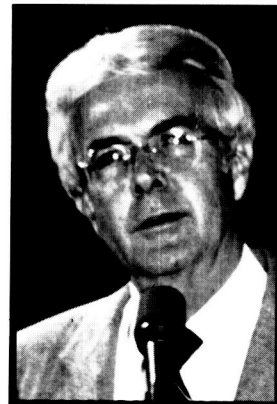
"In order to maintain or improve our leadership position in a highly competitive industry, we are determined to manage our physical resources, financial resources, and human resources more effectively and efficiently than ever before. We see productivity, quality and service improvement as the key." (James R. Lincicome, Motorola, Inc.)

“ . . . a corporation or any organization, just like human beings, tends to get old, arthritic, set in their ways, unable to react to changing times, and unless there is some self-renewal process, that organization, like an individual, will die. Now that’s a pretty strong word, but I think it applies just as readily to corporations as it does to individuals.” (Sanford N. McDonnell, McDonnell Douglas Corporation)

“I like to use ‘productivity’ as a measure of general industrial health.” (June M. Collier, National Industries, Inc.)

Implementing cultural change requires vision, commitment, and energy. It is a process with broad implications. Revitalization will enable a factory to keep open its doors; it will permit a Government agency to accomplish its mission with fewer taxpayer dollars; it will help ensure a robust economic future for a nation’s citizens so that they can continue to enjoy a high standard of living. Revitalization requires teamwork and dedicated leadership. It requires consensus and a clearly defined strategy; it is based on a commitment to quality.

In the pages which follow, these strategies and others which emerged from the Second NASA Symposium are presented and summarized. Following the format of the first symposium report, they are broadly grouped as STRATEGIES which represent both a synopsis and synthesis of the issues discussed. After a brief overview of the need for action, particular recommendations are highlighted, followed by examples of what some successful organizations are doing to meet the challenge.



Sanford N. McDonnell
McDonnell Douglas Corporation



June M. Collier
National Industries, Inc.

Executive Summary

During the last decade, the United States has lost competitive stature in the world. Challenged daily by a technically sophisticated and vitalized global economy, industry and Government are examining quality and productivity initiatives with which to meet the foreign competitive challenge. At stake are our quality of life and our standard of living for the remainder of this century and beyond.

Being competitive is an ongoing process, tuned to an awareness and understanding of the dynamics of the world marketplace and to the changing nature of the work environment. Solutions to America's quality and productivity problems do not exist independently within any organization or industry or at any given level of society. Success depends on commitment, partnership, meshing of goals and responsibilities, mutual respect and understanding, and a desire to be first.

A change in organizational management culture is required. Traditional authoritarian management practices must give way to enlightened leadership initiatives that stress employee involvement and participation. There must be a lessening of adversarial relationships between management and labor and between industry and Government. Quality and productivity are understood to be the end result of an integrated process which begins with vigorous, committed leadership and ends with a satisfied customer.

The essential elements in the revitalization process are organized in this report into seven strategies which represent the major findings of the Second NASA Symposium on Quality and Productivity. Each strategy is then broken down into its principal themes which are presented as recommendations. No one strategy can stand apart from any other; all are interrelated and work together.

Cultural change begins at the top with visible, valid commitment. Leaders must be active, persistent advocates of the need for change. At both the national and organizational levels, leadership is responsible for developing clearly defined goals and objectives to improve quality and increase productivity while creating an environment that enables that change to take place. This includes re-educating the middle manager and fostering teamwork at all levels.

STRATEGY 1
Leadership Must Commit to Revitalization

A top-quality mentality is a requisite for organizational and product survival. It is an attitude that must be ingrained as a way of life for an organization—part of a philosophy that says: “When I pass my work on to the next person, it will be the best that I can do.” It is the essential ingredient in a management culture that refuses to condone waste and is constantly looking for ways to make improvements. From the customer’s perspective, it is the expectation of quality, the refusal to accept anything but the best. Quality performance should be recognized and rewarded by the organization.

STRATEGY 2
Make Quality Integral to Organizational Culture

World class competitive organizations know their customers and are able to apply management techniques and organizational skills to provide what their customers want. They recognize that quality is what the customer needs. They work with their customers as partners throughout the product design, development, and delivery process. Focusing on both internal and external customers is an essential ingredient to an organization’s future success.

STRATEGY 3
Focus on the Customer

Basic to improvement is the ability to change and adjust to competition and to customer demands. Maintaining an entrepreneurial spirit and an openness to new technology and ideas requires management’s ability to accept and manage risk. This is essential to fostering innovation and to carrying the fruits of innovation to a successful conclusion in the form of marketable products and quality services. Successful organizations are able to accept risk and manage change as a part of growth, understanding that focusing on long-range goals and having a vision for the future is more important than a preoccupation with the short-term “bottom line.”

STRATEGY 4
Accept and Manage Change

STRATEGY 5
Establish a Process To Involve and
Recognize Employees

Good communications throughout an organization are essential to the revitalization process and help instill a sense of shared destiny in the work force. Employee motivation is *the* critical task associated with improving quality and productivity. Good communications and trust are essential to marshalling employee talents and capabilities to solve problems and allow continuous improvement to become an organizational way of life. Participative management should be encouraged in the organization and supported by ongoing management/employee training programs. It is particularly important that new programs are not perceived as undermining employee jobs or positions. Employee teams and suggestion programs, tailored to an organizational culture, stimulate involvement; they allow issues to be addressed by those who are closest to the problem. Gainsharing, or other forms of employee recognition, can be used as an opportunity for sharing the benefits of improvement.

STRATEGY 6
Measure Activities To Evaluate Success

Achieving a top-quality culture within an organization requires continual, measurable improvements. Measurement is far more than keeping score. It is necessary for good communications and for focusing attention on priorities and on areas needing improvement. It provides for reinforcement of progress toward goals and ensures and establishes accountability and an evaluation of "how well one is doing." Measures are most successful when employees are involved in determining what the measures should be and how to achieve them—employee ownership is essential.

STRATEGY 7
Emphasize Education as a Key to the Future

A quality ethic and a highly productive society depend on an educated work force. In order to be competitive, organizations must be able to employ qualified people and then "involve" them, in order to maximize their contributions and establish a basis for developing high-quality products and services. Thus, in the broader context, America must produce a talented, educated work force, with the awareness and understanding necessary to function effectively and be productive. Business must let the educational establishment know what it needs, and be willing to work closely with schools and universities to achieve it. Business and Government leaders must support the upgrading of the Nation's educational system.

STRATEGY 1: Leadership Must Commit to Revitalization

During the highly competitive 1980's, the operational status quo of the large, middle-aged organization is giving way to a cultural ethic based on consensus, mutual respect, and the recognition of interdependency. In order to survive, the mature organization must embrace a process that loosens up the traditional management structure and permits the interchange of ideas and initiatives within a supportive environment. To be competitive, an organization must remove the obstacles that hinder innovation and creativity, while institutionalizing those practices that promote assessment and continual improvement. This revitalization or self-renewal process is evolutionary; it is keyed to an understanding of the dynamics of a particular work environment and of what it takes to motivate people. It is the opposite of what Andrew S. Grove of Intel Corporation calls "organizational inertia."

"Organizational inertia is a measure of how much the day-to-day policies, procedures and protocols get in the way of employees trying to do their job Organizational inertia is a terrible disease It dissipates the energy of individuals that make up [an] organization . . ." (Andrew S. Grove, Intel Corporation)

There is no single master plan for counteracting the effects of organizational inertia. Each situation is unique and requires its own solution. Whatever the process used, however, the responsibility for self-renewal begins at the top.

" . . . senior level managers . . . have the ability, authority, and the responsibility to change [their] organizations for the better . . ." (Joyce R. Jarrett, NASA)

"I found myself putting the competitive challenge as high up on the list of what really motivates our thrust as anything that I could see in the program [In competitive situations], everybody has to get involved and that really means everybody." (George B. Merrick, Rockwell International Corporation)

The issue of competitiveness has far-reaching implications for the national leadership, as well. There exists a growing need for a national agenda to deal with the competitiveness problem.

Recommendation 1.1 Top Management Must Initiate Cultural Change

Cultural change requires the ability to see the operational functioning of an organization as a series of interrelated activities. Cultural change is a process put in motion by top management and sustained by its spirit, energy, and commitment. Competitive organizations are led by individuals who function as active, visible, responsive advocates of the need for change and who take control in implementing the specifics of change throughout their organizations.

"Management in its role as leader is the key. Unless we dramatically change the way we manage, we will lose the global competition we find ourselves in today." (Larry F. Wright, Dow Chemical USA)

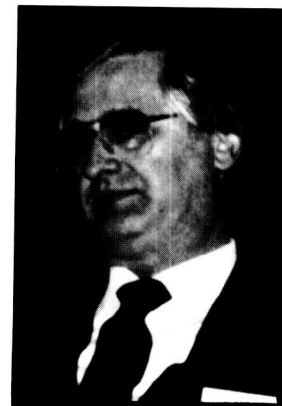
"Perhaps the most difficult aspect of changing the culture is creating a culture where change is encouraged, and that responsibility rests squarely with us as managers We must be



Joyce R. Jarrett
NASA Headquarters



George B. Merrick
Rockwell International Corporation



Donald B. Rassier
Ford Aerospace and Communications Corporation



Robert W. Hager
Boeing Aerospace Company

role models who make symbols and reality mesh. We must root out the old rigid policies and procedures, break down barriers, build teamwork, and reward innovation and results. Above all, we must involve the people . . .” (Donald B. Rassier, Ford Aerospace & Communications)

“I think the problem turns out to be that the managers themselves must really believe what they’re doing . . . Unless you put on that cloak of credibility and really believe in this, there’s not a soul out there working for you that’s going to support you in that operation.” (Robert W. Hager, Boeing Aerospace Company)

“ . . the chief executive officer can’t find a scapegoat. He must be the chief quality officer in an organization because from him must derive the policies, the principles, and the priorities that affect an organization’s growth and development.” (William R. Hoover, Computer Sciences Corporation)

Recommendation 1.2 Develop Clearly Defined Goals and Objectives and Communicate Them Throughout the Organization

One of the essential tasks for management is establishing meaningful targets for quality and productivity improvements and then setting realistic agendas to achieve them.

“[One of the keys to self-renewal] is strategic management. Strategic management is determining what your strengths are as a corporation, what your competitor’s strengths are, what the marketplace needs and wants, and then coming up with a strategic thrust to try to maximize and utilize your strengths to meet the needs of your customer and then translate that into your operating plans.” (Sanford N. McDonnell, McDonnell Douglas Corporation)

The process cannot be rigid, for new opportunities will constantly present themselves, and management must be willing and able to vary from an established procedure when required.

“We’ve got to get the people working together, and we are talking about continued improvements now . . . First understanding what the variation of the process is and then finding out what the opportunities are.” (Lewis W. Springer, The Campbell Soup Company)

Once management has its goals and objectives established, it must communicate them clearly throughout the organization. This process is essential to problem solving since it creates awareness and understanding.

“ . . communication throughout the organization . . . really establishes in each individual a level of awareness that makes that individual a more effective problem solver. In other words, if people are aware of the situation that the organization is operating within—the external environment, the objectives of the organization—then they are much more likely to be able to come up with solutions to the problems that the organization faces.” (William F. Ballhaus, Jr., NASA Ames Research Center)



William R. Hoover
Computer Sciences Corporation



Lewis W. Springer
The Campbell Soup Company

Recommendation 1.3 Examine Organizational Policies and Practices and Eliminate Those That "Get in the Way"

"It is difficult for the large, mature companies with good products that virtually sell themselves to explore new horizons. Management ranks may be too entrenched, policies too rigid, and channels too congested for good ideas to germinate, let alone bubble to the surface. And a company consumed by overhead or enamored of the status quo is scarcely conducive to creative thought that might prove costly or disruptive. Innovation prospers most in a management environment porous enough to let good ideas filter through." (Malcolm T. Stamper, The Boeing Company)

A "porous" organization is characterized by the ease with which ideas and information move through it. Within such an environment, management goals and objectives can be clearly communicated. At the same time, innovative concepts receive the recognition they deserve, take root, and become integrated into the operational dynamic of the organization.

Loosening up the system requires the ability to let go of entrenched, bureaucratic policies which hinder the creativity and enthusiasm of the employee. It is management's responsibility to recognize when its problems are in the organizational system itself; it must then take the necessary steps to streamline the process. This will not be easy.

"We found that 70 to 80% of the things that employees viewed as stifling innovation and creativity or that cause people to do unproductive or low priority work were within the control of the Forest Service and, quite frankly, we were surprised at that. We had wrongly assumed that we were the victim of bureaucratic circumstances largely beyond our control But . . . bold, courageous action [is required] . . . because that is the only way . . . we are ever going to overcome the tremendous forces of the past that are well-rooted in our rules, regulations, manuals, and systems, as well as overcome the vested interest of the status quo." (F. Dale Robertson, Forest Service)

"Layers of bureaucrats reporting to bureaucrats must end. Corporate staffers must deal directly with the workers on the line." (Rear Admiral Wayne E. Meyer, United States Navy, Retired)

"We've got to provide our people with the authority to do their jobs. We have to eliminate layers of management which only impede employees' and workers' success." (Albert J. Verderosa, Melbourne Systems Division, Grumman Corporation)

Recommendation 1.4 Support National Initiatives on Quality, Productivity, and Competitiveness

Successfully meeting the economic challenge which the United States faces requires a national consensus. All levels of society must be motivated to action by a committed leadership that recognizes that the long-term well-being of its citizenry is leadership's first priority. The reality of the Nation's loss of competitive posture is a declining standard of living.



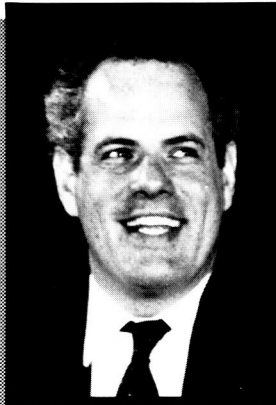
F. Dale Robertson
Forest Service



Rear Admiral Wayne E. Meyer
United States Navy (Retired)



Albert J. Verderosa
Grumman Corporation



David R. Braunstein
Douglas Aircraft Company

"Our children will continue to suffer the impact of being a less competitive nation. Over the past decade, our standard of living has dropped. . . . We have the distinction of being the first American generation to pass to our children a poorer economic future."
(David R. Braunstein, Douglas Aircraft Company).

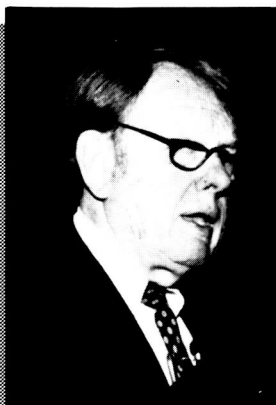
Just as organizations must relinquish outmoded cultural practices in order to survive, so the Nation must give up the complacency that feeds the status quo and prevents the necessary national adjustments to the worldwide competitive challenge. These adjustments will come only if the trouble signs are heeded and the issues widely debated.

"The economic challenge facing this country for the rest of this century is immense. The Young Commission Report and the reports of the Business-Higher Education Forum all have described the problem. That challenge is essentially: how can we reverse the decline in the standard of living that we have experienced in the United States for at least the last decade? The answer we supply to the question will affect our lives, but even more, it will affect the lives of our children and grandchildren . . ."
(Senator Jeff Bingaman, Democrat, New Mexico)

". . . All government should begin to take the lead in highlighting the importance of competitiveness." (Joseph R. Wright, Jr., Deputy Director of the Office of Management and Budget)



William F. Ballhaus, Jr.
NASA Ames Research Center



Malcolm T. Stamper
The Boeing Company

STRATEGY 2: Make Quality Integral to Organizational Culture

During America's industrial heyday, "quality" was whatever America produced for a product-hungry world. The American standard was *the* standard for excellence; we had no meaningful competition. Now, quality is defined by world standards. The rules have changed, and there are many top players. To examine the issue of quality where once no examination was required is to look to the institutional philosophy—the basic ethics upon which an organization is founded. It requires a willingness on the part of management to recognize that quality must be part of the organizational culture.

Recommendation 2.1 Make Quality the First Priority

At the heart of revitalization lies a fundamental commitment to excellence. A quality ethic is the basic framework upon which long-lasting productivity improvements are based. It is part of a culture that does not put up with waste and is constantly looking for ways to make improvements.

"We try to go in and prevent the problem from ever occurring . . . [and] try and do it right the first time . . . Look at [the problem] analytically so that you can get at the source . . . [and] not . . . when you have to repair it or rework it or get an inspector to buy it slightly out of standard." (Thomas R. Rooney, Northrop Corporation)

"We have been led to believe that there is no such thing as good or bad quality, only conformance or nonconformance. That definition is wrong. It has led us down a blind alley. It has led us to mediocre quality and high cost." (D. Travis Engen, ITT Avionics Division)

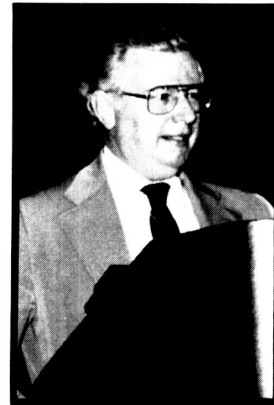
"Our quality focus . . . goes hand in hand with our effort to improve the productivity of each member of our work force in every facet of our operation." (General Richard H. Thompson, U.S. Army Materiel Command)

A quality ethic grows out of a desire to be the best, to be a winner. It must become a habit and eventually form part of an organization's core values, its basic principles.

"We've got to make a new commitment to wanting to be first. That shouldn't be hard. That's been a characteristic of America from the very beginning." (David Packard, Hewlett-Packard Company)

"The work ethic is built into us. It's a habit. It's either in your nature or it's not in your nature. Now the quality ethic is not quite as well defined. It's that whisper inside of you that says don't ship that product until that job is done. It's not right." (Robert W. Hager, Boeing Aerospace Company)

"We have . . . project manager reviews where [the manager] takes ownership of the total quality of his product." (Paul W. Mayhew, TRW Space & Technology Group)



Thomas R. Rooney
Northrop Corporation



General Richard H. Thompson
U.S. Army Materiel Command



Paul W. Mayhew
TRW Space & Technology Group



Bernard L. Koff
Pratt & Whitney

"It is our leadership and our example, our insistence on solid engineering values that will make and keep America a winner We've got to keep in mind the law that Sergeant Preston of the Yukon established many years ago . . . : 'The scenery changes only for the lead dog.'" (Roland W. Schmitt, General Electric Company)

"Pride in workmanship is what gives you extreme good quality."
(Bernard L. Koff, Pratt & Whitney)

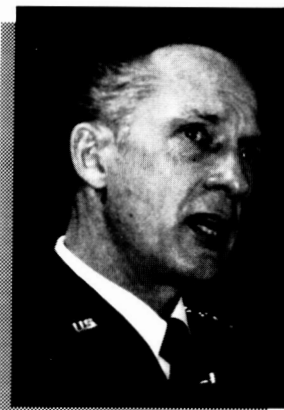
Recommendation 2.2 Define Quality as Meeting Your Customer's Needs

Quality standards rest with satisfying the customer's expectations.

"[Piecemeal] quality programs, no matter how saintly the intentions and no matter how carefully planned they may be . . . are doomed to fail. They will not produce any long-lasting results. For the basic truth is that people tend to do exactly what they believe is expected of them. No matter that management has recognized the need for improved quality and even said so out loud. If production schedules appear to be more important than a lot of lip service to quality, then no manager will risk his job by closing down a production line for quality deficiencies. Management must create the environment where people will have the courage to do the right thing for their customer and that quite simply is the quality ethic."
(Richard C. Close, Eastman Kodak Company)

Quality then becomes a two-way process, with the customer demanding the quality he receives.

"In the past, we have not always asked for [the highest level of quality], and as a consequence, industry and you have not provided it. But the ground rules have changed."
(General John L. Piotrowski, United States Air Force)



General John L. Piotrowski
U.S. Air Force

Recommendation 2.3 Reward Quality Performance

A successful quality program requires that an organization recognize and reward employee achievements. Recognition by the organization validates an employee's efforts and integrates his performance into the overall organizational goals and objectives. Recognition in the form of a benefit—often, but not always, monetary—helps the individual trust in his accomplishments and believe that he is truly part of a team. The team concept is believed to be particularly important, with group achievements emphasized, rather than those that are strictly individual. Rewards are often part of an organizational structure that encourages people to do what is in the best interest of the organization because they perceive it to be in their best interests as well.

"Employees have to believe that quality improvement is mandatory to their welfare in today's environment, whether it be world class competition or local competition." (Vincent N. Cook, IBM Corporation)



D. Travis Engen
ITT Avionics Division

STRATEGY 3: Focus on the Customer

Linking quality and the customer provides a focus for the day-to-day operations of an organization, especially when the “customer” is understood to be any user of a product or service. Everyone must focus on the customer—internal or external—at a very basic level, for it is the customer’s needs that should drive the design, function, and even cost of a product. Close, two-way communication between supplier and customer is, therefore, essential. When possible, the customer should be involved in the development of a product from the earliest stages.

Recommendation 3.1 Know Your Customers and Understand Their Needs

Within large organizations lost in bureaucratic detail, knowing who the customer is is often undefined or forgotten. Keeping the customer as the basic focus requires knowing who that customer is.

“Sometimes just knowing who your customer is can be confusing. In a large organization, the customer may not be and probably is not the end user of the product. It might be the next department or a function which continues or is dependent upon the work.”
(Richard C. Close, Eastman Kodak Company)

Recommendation 3.2 Define Your Organization’s Objectives To Meet the Customer’s Needs

The dynamics of the marketplace exert real demands on an organization. In order to properly devote resources to developing products and services that have market value, organizations must be skilled at determining what the customer wants.

“... product quality is what the customer [is] after and ... the better the product, the higher the quality, the more satisfied the customer, the more competitive we [are].” (Aris Melissaratos, Westinghouse Electric Corporation)

“[The] philosophy begins with quality and being responsive to our customers needs and wants and extends to incorporate such ideas as employee involvement and treating both our suppliers and our dealers as partners in our business ... To do [this], we had to reshape not only our products but the thinking of thousands of people within one of America’s largest corporations.” (John W. Risk, Ford Motor Company)

Recommendation 3.3 Maintain Two-Way Communications With the Customer

Whether the customer uses a product as a function in his work, or is the end-user as consumer, determining the customer’s needs requires meaningful, two-way communications and continually “taking the temperature” of the customer’s expectations.



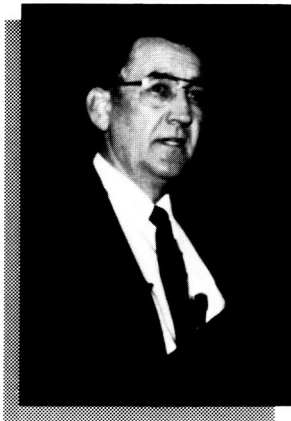
Richard C. Close
Eastman Kodak Company



Aris Melissaratos
Westinghouse Electric Corporation



John W. Risk
Ford Motor Company



Larry F. Wright
Dow Chemical U.S.A.

"More customers are visiting us than ever before. We encourage our marketing people to bring their customers to 'where the action is.' We want to know what the customer thinks about us."
(Larry F. Wright, Dow Chemical, USA)

"There is no amount of internal inspection that allows you to determine what value is. Only a paying customer [who] has a choice can determine value, which means that value is determined from the outside." (Thomas J. Murrin, Westinghouse Electric Corporation)



Thomas J. Murrin
Westinghouse Electric Corporation

STRATEGY 4: Accept and Manage Change

"It must be remembered that there is nothing more difficult to plan, less likely to succeed, or more dangerous to manage than the creation of a new order of things. For the creator gathers unto himself the enmity of all those who have profited from the preservation of the old establishments, while gaining only lukewarm support from those who will gain from the new."
(Alfred S. Warren, Jr., General Motors Corporation, quoting Machiavelli)

To the young, startup company, risk is a natural element in the process of establishment and growth. For the mature organization, risk-taking threatens the well-entrenched rhythm of the status quo, and seems to fly in the face of a traditional structure that has its own momentum and rationale. Yet being able to accept and manage risk is essential to revitalization and self-renewal. It is *the* element of cultural change which opens the way to innovation and provides a pathway to future success and growth. But is it possible for a large organization to manifest the characteristics of the entrepreneurial startup company?

Recommendation 4.1 Develop a Leadership Philosophy That Recognizes the Value of Change and Opportunity

Developing an entrepreneurial spirit within a large corporation begins with the ability to recognize the essential conflict that exists between the risk taker and the forces of the status quo. A large organization is driven by a different set of values from those that motivate the entrepreneur. One of the most fundamental is goals or objectives.

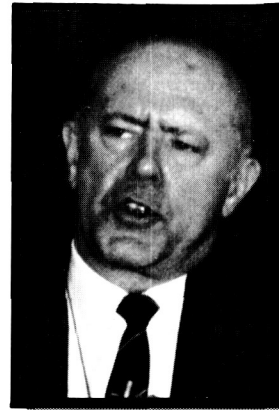
"Many innovators tend to be technology-driven. They want to invent something. Many large companies tend to be market-driven. They may respond, 'We can't fund that. There's no market for it,' or, 'That's not in our line of business' . . . Many startup [companies] occurred because an employee took an idea to his management and was told there was no market." (Brian R. Carlisle, Adept Technology, Inc.)

Thus, to be innovative, an organization must be able to assume the risk of pursuing ideas and technologies outside its main business; it must work with, not against, its entrepreneurs by establishing an operational framework that examines the new for its potential value and is able to accommodate it within its overall operational strategy. William S. Gale of the Gillette Company suggests that this may only be possible by looking outside the main organization to establish and finance new companies.

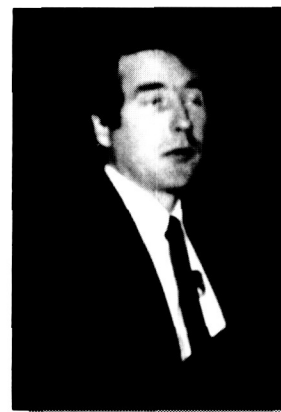
"You can begin to consider how to foster entrepreneurialism outside the company . . . by investing in venture capital funds, investing in other limited partnerships, establishing your own venture capital fund, or by investing in joint ventures."
(William S. Gale, The Gillette Company)

Recommendation 4.2 Establish a Process That Allows Rapid Implementation of Innovative Concepts or Ideas

If it is possible to institutionalize an entrepreneurial spirit within a large organization, an essential requirement is setting in motion a process which moves innovation quickly from idea through the necessary steps



Alfred S. Warren, Jr.
General Motors Corporation



Brian R. Carlisle
Adept Technology, Inc.



William S. Gale
The Gillette Company

to conclusion. This begins with a fast decision-making process at the start to screen new ideas, and once an idea is accepted, may require giving control of development and implementation to a smaller group or team within the organization.

“It is my belief that the single item most precious to the entrepreneur is control, control of decisions, control of money, control of the resources available to him. With control he can move quickly; without it, he is frustrated and lost. The reason most people . . . start companies is to gain control.” (Brian R. Carlisle, Adept Technology, Inc.)

Once a development program is in place, it may be necessary to protect it from any budgetary pressures that the larger organization is experiencing.

“We call these [programs] protected domains. They are not protected forever, but they are protected until they are big enough to fight for themselves against the other requirements of the organization.” (Andrew S. Grove, Intel Corporation)

Competitiveness requires being first with the best. For Roland Schmitt of the General Electric Company, this requires evaluation and reassessment throughout the implementation process; it implies a return to basic principles and fundamental practices which link need, function, and cost in order to quickly turn America’s genius for innovation into marketable products.

“The United States has not lost the innovative edge that in the past has made us winners in the world economy . . . but we have slipped in the field of engineering execution. That is, in the steps between the original idea and the deployment of the product or process into use. We get to market or to the field too late with a product costing too much Putting constraints as well as demands on a development will almost always make for better engineering. However challenging the end goal, approach it step-by-step, learning at each step not only how to improve the path to the goal but also whether the goal itself should be modified.” (Roland W. Schmitt, General Electric Company)

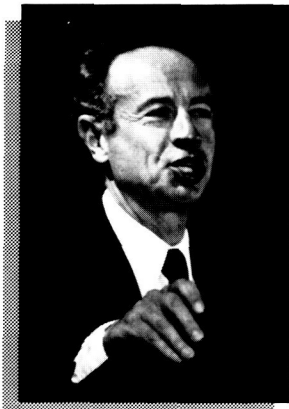
Once objectives are clearly in mind, speed to market is essential.

“Constantly look for ways to reduce time to market. Nothing shows the presence or absence of organizational inertia as clearly as the ability of an organization to bring a product or service or a capability to its customers.” (Andrew S. Grove, Intel Corporation)

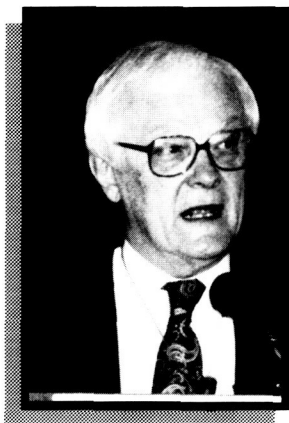
Recommendation 4.3 Establish a Vision for the Future

Underlying the strategic framework of successful companies is a vital, yet intangible, element—a sense of vision. It is another attribute of the entrepreneur, one which generates a willingness to take risks, to “bet the company” on an innovative, bold idea. It has the ability to revitalize the mature organization.

“To accomplish great things, an organization must have a bold vision or aspiration for the future. . . . A grand vision . . . attracts



Andrew S. Grove
Intel Corporation



Roland W. Schmitt
General Electric Company

outstanding people, it creates energy in those people, gives them a sense of purpose, and provides a framework for an organization in making decisions concerning the allocation of resources, to accomplish the vision." (William F. Ballhaus, Jr., NASA Ames Research Center)

Vision and risk-taking are often at odds with pressures to show favorable quarterly performance for stockholders. Fostering entrepreneurialism requires the ability to look beyond the "bottom-line."

"An executive who can't see beyond the bottom line can hardly see into the next century. American management has been accused of being shortsighted, favoring near-term gains over long-term investments. Every chief executive feels the financial pinch from time to time, and pressures to improve earnings can make research budget cuts often tempting and sometimes inevitable. But since vision is the antecedent to growth, stinting on R&D dulls the one and dooms the other. Accountants may have a hard time justifying the value of visionaries, but we would be technologically bankrupt without them." (Malcolm T. Stamper, The Boeing Company)

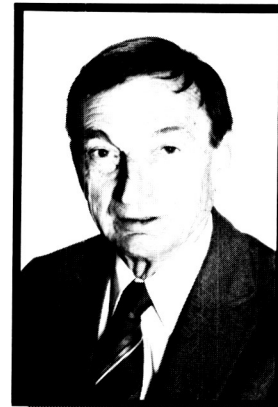
Recommendation 4.4 Understand the Elements Involved in Managing Risk

Successful risk management requires alertness and an understanding of the entire operational dynamics of an organization. It is the ability to recognize the problems that may result from a deficient design or concept. It is knowing how to properly manage the people who are charged with the implementation and execution of a development program. It is understanding that risk is always present, and having the skills in place to control the risk factor.

"There is no such thing as zero risk. We live in a technological world where progress and risk are really directly related. The problem we have as professionals is how better to manage the risk inherent in our various activities and products." (George A. Rodney, NASA Headquarters)

"We are living in an age where the single biggest factor affecting productivity may be our ability to properly manage technical risks. The organizations and nations that can best manage to control those risks are the ones that are going to win the productivity race. Managing product reliability and managing people to enable them to do their best, these are our key challenges in this increasingly competitive, increasingly technological world." (James C. Fletcher, NASA Administrator)

"I think there is a tendency in government . . . to play it by the books. Don't take risks. Don't be innovative. . . . We've got to come up with a system that provides the people with the incentives to be innovative and creative and take risks, and that allows them to fail on occasion." (Terence C. Golden, General Services Administration)



George A. Rodney
National Aeronautics & Space Administration



James C. Fletcher
National Aeronautics & Space Administration



Terence C. Golden
General Services Administration

Recommendation 5.2 Use Participative Management To “Tap” the Ideas and Energies of All Employees

“Our old assumptions about management style are out of date. We must find new ways to tap our work force creativity and energy. The result will be improved quality.” (John J. Franke, Jr., U.S. Department of Agriculture)

“It’s a cultural problem, particularly at the extremes of the salary levels and management levels. The lowest level employee has to be taught that in fact he has good ideas, and that if he makes those suggestions, they won’t be brought down around his neck if they sound critical. . . .” (James R. Lincicome, Motorola, Inc.)

Organizations that have instituted management practices based on continual communication with employees recognize that people *want* to be involved. The process often requires starting small, in order to work through the natural resistance to a new procedure, until the benefits of “participative management” can be recognized—until it is generally acknowledged that, in the words of Robert W. Galvin of Motorola, “the collective knowledge of all is obviously much greater than the single knowledge of a few.”

“People are always able to respond in some form, people are always able to commit in some form, and people are always able to author in some form. . . . [Thus] people are more productive in action, when they’ve sorted out clear and consistent notions of responsibility, accountability, and authority.” (Robert B. Young, Jr., Lockheed Corporation)

“[In order] to defend the Republic with the fewer dollars that are going to be available to us in the years ahead . . . [we must] put human ingenuity to work. . . . [Yet] people are smart enough to outsmart any system we devise to control them. So what we try to do is look for ways . . . to maximize human nature to get it to work for us as opposed to against us.” (J. Michael Kelly, U.S. Air Force)

“. . . the essence of the full participatory management of our universities . . . makes our environment one that [encourages] innovation and creativity and is an extremely valuable asset that we must preserve.” (John S. Toll, President, University of Maryland)

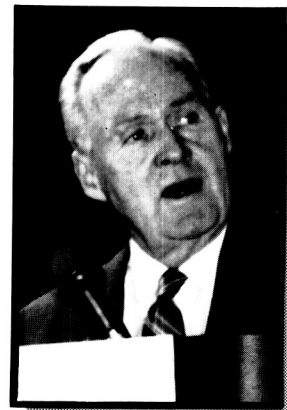
“I’ve never been so astounded in my whole life as what happens when you start working with people and give them wherewithall to go to work on their own projects and problems. It really works.” (Larry A. Frame, Litton Guidance and Control)

One of the basic tenets of participative management is pushing decisions down to the lowest level of responsibility and understanding.

“The process has to be to push decisions down to the closest level of the problem—very, very tough to do, but that’s what’s got to be done. We’re all an aggregate of a lot of little decisions and those decisions have to be made by people who thoroughly understand. Most of the bureaucracies I know always succeed in taking that decision-making level to one step above anybody who really knows anything about it.” (Andrew C. Sigler, Champion International Corporation)



John J. Franke, Jr.
U.S. Department of Agriculture



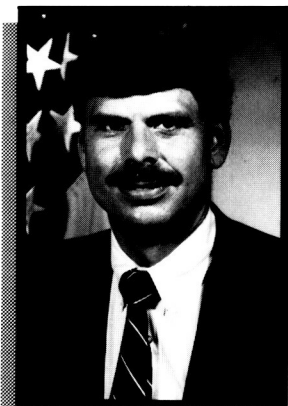
Robert W. Galvin
Motorola, Inc.



John S. Toll
University of Maryland



Robert B. Young, Jr.
Lockheed Corporation



J. Michael Kelly
U.S. Air Force



Norman R. Augustine
Martin Marietta Corporation

"We're learning, often the hard way, that the person who knows the most about a job is the one doing it. We're also finding that the catalyst in the Japanese formula for success isn't robotics, but a management system that makes the employee an integral part of the team." (Malcolm T. Stamper, The Boeing Company)

Because participative management relies on direct employee involvement in organizational plans and activities, such a program should be tailored to the specific needs of an organization. The structure may involve independent teams with decision-making authority or it may involve "I recommend" or other forms of employee suggestion programs. Whatever the particular program, an often unanticipated result is the emergence of new and valuable leaders from the ranks of employees.

"What it boils down to, I believe, is leadership development. Through these communication efforts, through these participative team efforts and so forth, what we've done is permit our people to show us a multi-faceted side of their skills and leaders have begun to emerge." (Aris Melissaratos, Westinghouse Electric Corporation)

"We think the German philosopher Goethe was correct when he said, 'Treat people as though they were what they ought to be, and you will help them become what they are capable of being.'" (William B. Potter, Preston Corporation)

Recommendation 5.3 Consider Gainsharing as an Opportunity for Involvement

Organizations have employed various methods to encourage employee identification with company goals. One of the most popular has been gainsharing, a recognition program based on the sharing of the "gain" that results from outstanding productivity improvements.

"The strength of gainsharing is that it provides the opportunity for people to become involved and to develop a common goal on the basis of which they can earn rewards Earning a chance to share in the wealth is one of the cornerstones of our whole civilization." (Sanford N. McDonnell, McDonnell Douglas Corporation)

Gainsharing not only gives people the opportunity to be involved, it provides a structure for this to take place. Ultimately, the structure itself may be more important than the financial rewards.

"There are other very important factors in terms of increasing productivity The Hawthorne experiment . . . was a classic [example of something at work, namely] employee motivation The feeling of need and being part of something important was much more important than anything you could measure in dollars and cents." (Norman R. Augustine, Martin Marietta Corporation)

Gainsharing works most successfully when it is used in conjunction with other programs. Cultural change is tied to many integrated, broad-based initiatives which are constantly evolving. What does not change

STRATEGY 5: Establish a Process To Involve and Recognize Employees



Anthony A. Cardinal

E. I. DuPont de Nemours & Company, Inc.

One of the most important tasks for management within the large, multi-level organization, is instilling in its employees a sense of shared destiny. This feeling of involvement, of mutuality, can provide the link which integrates all the activities of an organization and ultimately becomes the critical element associated with quality and productivity. Motivation and involvement cannot be imposed, however. They are born spontaneously out of a sense of ownership, out of an understanding by each employee of the importance of his role in the total organization.

"In our old culture, what we effectively did was ask [our employees] to check their brains at the gate and to pick them up again on the way out. . . . We have a lot of our facilities in small towns where [many] of our employees are independent farmers running their own businesses; many of them are community leaders in service organizations, and a fair number of them have college degrees. We were clearly not tapping that resource." (Anthony A. Cardinal, E.I. DuPont de Nemours & Company, Inc.)



William B. Potter

Preston Corporation

"Our commitment to excellence is a combination of both our mission and our philosophy statement. It has been signed by me and by each one of my 5,500 associates. We have 5,500 people working at Preston today and we don't have one single employee. We have 5,500 associates." (William B. Potter, Preston Corporation)

Recommendation 5.1 Create Open, Two-Way Communication

A key to creating an environment in which cultural change can take place is communication—communication among people at all levels of the organization. Communication provides the knowledge out of which teamwork can flourish.

"[Once you've got momentum going, you've got to maintain it]. That takes constant communication with the people. Walking the shop, rubbing elbows, making everyone feel a part of it, generating the enthusiasm, having lots of meetings, standing up on the top of the desk and speaking to the people in a room, having a tent meeting. . . ." (Bernard L. Koff, Pratt & Whitney)

"It isn't enough just to say I've got an open door. . . . You have to create credibility by how you operate. . . . So if there is a pile of bodies outside the executive suite, there won't be any more coming up." (Peter W. Wood, Booz, Allen & Hamilton Inc.)

"We need to concentrate as much on union leadership development as we do on the management development side, because our union leaders are nothing more than an extension of the total management team, if they understand the organization's objectives. Through communications . . . we've been able to get our union leaders involved in understanding the business; and I worry as much about steward development as I do about first line supervisor development." (Aris Melissaratos, Westinghouse Electric Corporation)



Peter W. Wood

Booz, Allen & Hamilton Inc.

Communication works both ways; it must be not only a top-down approach, but one which is top-down, bottom-up. Managers must be taught not only to communicate, but to listen.

throughout the process is the importance of trust, communication, commitment, mutual respect, and the acceptance of responsibility.

"Gainsharing can be a valuable tool to increasing an organization's productivity but . . . to be successful, it must be based in conjunction with other techniques. It's just one leg of a many-legged stool. Simply starting a gainsharing program will not guarantee you success." (Katherine M. Bulow, U.S. Department of Commerce)

"Gainsharing is not an isolated event and it's not an isolated initiative Integration is the key issue. Gainsharing [must be] part of an overall integrated activity that combines to achieve necessary objectives and quality and productivity for your organization." (John D. Wolf, McDonnell Aircraft Company)

Recommendation 5.4 Institute Ongoing Training Programs

Successful change evolves from understanding—understanding the processes and procedures which are the nuts and bolts of a new approach. Participative management techniques are based on constantly evolving standards which grow out of the dynamics of a particular work environment. Being able to give up old, familiar practices for something yet unknown and undefined requires training in the new system at both management and nonmanagement levels. The training required is not only in the new procedures, but also in the realities of the changing nature of the work environment.

"We have to get the total system working more efficiently. It's not just getting people to work harder, it's getting the total process [working] more intelligently. I think some of the keys to this are commitment, a broad involvement, champions, leaders who want to take risk, and the enthusiasm, the positive attitude that you have to get into people. This doesn't come from hiring consultants necessarily, it's training, training, training." (Donald B. Rassier, Ford Aerospace & Communications)

"We found that with some fairly straightforward training, we could do a lot in terms of making people more productive and more efficient in their team activities." (Larry A. Frame, Litton Guidance and Control)

"The exposure of our supervisors to the training available in productivity measures has generated a broader base of support." (Richard H. Petersen, NASA Langley Research Center)

Recommendation 5.5 Guarantee Employee Stability

New systems and processes will be seen as threatening if they are perceived to undermine the stability of an employee's job or position. An organization must find ways to streamline operations without dismantling the integrity of its staff and work force.

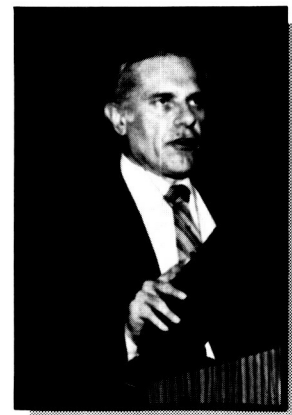
"You've got to get people to slowly realize their jobs aren't threatened, their future isn't threatened, that if we're more productive and more competitive, we can assure their jobs in the future. Then they're willing to gradually release the bonds that used to tie them, the old methods." (Thomas R. Rooney, Northrop Corporation)



Katherine M. Bulow
U.S. Department of Commerce



John D. Wolf
McDonnell Aircraft Company



Larry A. Frame
Litton Guidance and Control

STRATEGY 6: Measure Activities To Evaluate Success



Frederick F. Jenny
Unisys Corporation



Paul A. Strassmann
Xerox Corporation



Matthew A. Sutton
Honeywell, Inc.

The quality objectives of an organization are tied to the ability to measure improvements. In order to know how a company is doing competitively, the results of its efforts must be tracked. But measurement should not be used just to keep score—its particular value is in enabling management to anticipate potential problems and then take timely corrective actions to solve the problem. Developing the measurement tools to track white collar productivity is not easy, but, as more and more of the work force moves into the information environment, it becomes increasingly important.

“Criteria and measurement methods are reviewed periodically and revised or expanded based on actual experience obtained in each unique working environment . . . They tell us if we’re on the right track and they warn us if we’re running into trouble. Without measurement against the baseline, there is no information.”
(Frederick F. Jenny, Unisys)

“People love to put procedures into manuals on shelves and that’s it. We’re talking about something that, hopefully, the employees and the management process believe is fundamental—and that’s measurement. Measurements mean that you continually set your targets—higher or lower but know why you missed them or know why you didn’t do well enough.” (Vincent N. Cook, IBM Corporation)

“There are many ways of discriminating between turkeys and eagles. But there is one telltale sign which is always true. The turkeys always have twice as much overhead as the eagles.”
(Paul A. Strassmann, Xerox Corporation)

Recommendation 6.1 Use Measures To Identify, Analyze, and Solve Problems

Although tracking performance is an important part of the process, measurement should not be used just to keep score—its particular value is in enabling management to anticipate potential problems and then to take timely, corrective actions in solving the problem.

“The thrust of any measurement should be to identify, analyze, and solve problems . . . The real impetus for meaningful measures is problem solving.” (Matthew A. Sutton, Honeywell, Inc.)

Recommendation 6.2 Use Measures That Have Employee Ownership

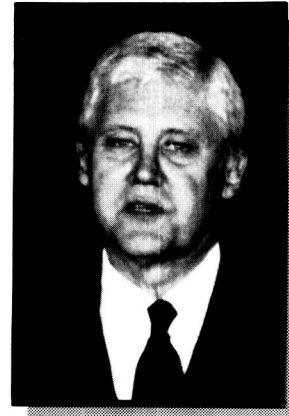
How should white collar measurement criteria be determined? Standard measurement criteria do not apply, because most existing measurements apply to standardized factory work. Different companies tend to apply different criteria, depending on what is most appropriate to their individual quality goals and objectives. As part of participative management initiatives, many organizations are pushing the task of developing measurement criteria down to the lower levels of the organization. Giving employees, such as project managers, direct control over determining measurement criteria for a particular project or activity, ensures that the criteria will best reflect the well-being of the project.

“ . . . our belief [is] that people involvement is the key to higher quality The people who do the fixing should also do the measuring.” (Matthew A. Sutton, Honeywell, Inc.)

Ultimately, measurement is a process that must be well-thought-out, utilizing as few measures as possible, which are in turn, subject to regular review.

“The idea is to get down to the right level of details so that you can assign measurement criteria. In our case, we assigned ranking criteria for measurements at a company level so it isn't just a wish list. It's well-thought-out goals and objectives and the right ones so that you're stretching as far as you can stretch.” (Vincent N. Cook, IBM Corporation)

“It is important to note that these measures are used only within the group and are owned by the work group.” (Richard H. Petersen, NASA Langley Research Center)



Vincent N. Cook
IBM Corporation



Richard H. Petersen
NASA Langley Research Center

STRATEGY 7: Emphasize Education as a Key to the Future



Andrew C. Sigler
Champion International Corporation

The controversies that surround the level and quality of teaching in America's schools and the statistics that point to her decreasing educational standards, make the challenge clear: the educational preparation of America's future work force cannot be taken for granted. Quality and productivity initiatives are dependent upon a trained, educated, and motivated work force. From management to research and development to product assembly and distribution, the skills, understanding, social awareness, and ethical values which are brought to the process, are the basis for increased productivity. A work force which lacks a solid educational foundation cannot be competitive.

"Today we are a nation that graduates only three-fourths of our high school students. We are wasting talent. Couple that statistic with the fact that the students who graduate have comparatively low science, English, and math scores, and our ability to be the leading technological society is clearly diminished." (David R. Braunstein, Douglas Aircraft Company)

"An intelligent work force that cares can give you more productivity advances than you ever dreamed. I think we've got to recognize that we're in a battle internationally, and our educational system is a very critical thing for us in dealing with it." (Andrew S. Sigler, Champion International Corporation)

Recommendation 7.1 Business Must Let the Educational Establishment Know What It Needs

There has existed a tradition in America that has said that the schools will take care of education. Business has assumed that the Nation's school systems would continue to provide workers with sufficient education and technical literacy to staff its offices and man its factories, that universities would always be able to provide engineers in sufficient numbers to maintain our technological superiority, and that the schools would complete and refine the socializing process, so that individual workers would have the necessary skills to work successfully together. However, the forces at work in a rapidly changing, pluralistic society, send mixed signals to our school systems and strain limited resources. Dependent upon the quality of the educational product, business must engage in a dialogue with the Nation's educational institutions, communicating clearly its needs and being willing to lend support to achieve them.

"As you get all charged up about participative management and what can be accomplished, you've got to understand that part of your job is to make sure that education is working. I think one of the things we have to do, [is tell] the educators what kind of product is necessary for someone to make a living today." (Andrew S. Sigler, Champion International Corporation)

Exactly what kind of work force is required?

"The winners in manufacturing in the future will be the ones who realize there's only one untapped resource left . . . and that's people. Everything else you buy off the shelf. You have to hire mature, responsible adults." (Ross L. Silberstein, Sherwin-Williams Company)



Ross L. Silberstein
Sherwin-Williams Company

"I submit to you that we need to somehow learn some way to make a new commitment to winning. That we've got to begin by getting the best people we can on the team . . . I think a good many of you people know that we have not kept our basic education system up to standard during the last decade and a half. We're not graduating as many engineers as we should and we're not doing as much basic research as we should . . . We can't have a winning team without having winning players." (David Packard, Hewlett-Packard Company)

Recommendation 7.2 Support Upgrading the Educational System

The issues that comprise the quality and productivity dilemma require increased national attention. With so much at stake, the business community, together with Government, must work to bring the public's attention to the connection between education and competitiveness. In an area where there has been little public awareness or understanding, organizations can make valuable contributions by supporting educational initiatives that enhance the quality of elementary and high school education and strengthen the ability of the Nation's universities to train engineers and business leaders. The public needs to understand that the quality of education that a student receives directly affects the quality of his life and his standard of living in the future.

"I happen to be a kind of hokey believer in the thing called public debate . . . and I think business has to join the public debate on education, talk about what it needs and how . . . it will help support [educational] systems." (Andrew C. Sigler, Champion International Corporation)

"In my view, any serious attempt to deal with problems of low productivity growth must include a major commitment by the Federal Government to increased support for education." (Senator Jeff Bingaman, Democrat, New Mexico)



David Packard
Hewlett-Packard Company



Senator Jeff Bingaman
Democrat - New Mexico

Appendix A

Symposium Program and Speakers

Tuesday/2 December 1986

- 8:30 AM Opening Remarks
Joyce R. Jarrett, *General Co-Chairperson and Acting Director, NASA Productivity Programs*
- 8:40 AM Welcome and NASA Perspective
James C. Fletcher, *Administrator, NASA*
- 9:00 AM National Perspective
Joseph R. Wright, Jr., *Deputy Director, Office of Management and Budget*
- 9:30 AM Keynote Session A: "The Age of Agile Giants"
Andrew S. Grove, *President and Chief Operating Officer, Intel Corporation*
- 10:30 AM **Session A: Entrepreneurialism**
Workshop A1: Innovation
Chairman
Malcolm T. Stamper, *Vice Chairman of the Board, The Boeing Company*
Speakers
"Team Taurus and What It Means to the Ford Motor Company"
John W. Risk, *Director, Medium and Large FWD Programs, Ford Motor Company*
"Can a Middle-Aged Corporation Foster Innovation and Entrepreneurialism?"
William S. Gale, *Director, New Business Development, The Gillette Company*
"You Can't Rollerskate in a Buffalo Herd: How Large Organizations Can Benefit from Entrepreneurs"
Brian R. Carlisle, *Chairman, Adept Technology, Inc.*
Workshop A2: Constant Improvement
Chairman
Terrence C. Golden, *Administrator, General Services Administration*
Speaker
"Executing Innovation - The Tortoise and the Hare"
Roland W. Schmitt, *Senior Vice President, Corporate Research and Development, General Electric Company*
Workshop A3: Intrapreneurialism
Chairman
Peter W. Wood, *Senior Vice President, Booz, Allen & Hamilton Inc.*
Speakers
"Management Loyalty: Productivity's Missing Link"
June M. Collier, *President and Chief Executive Officer, National Industries, Inc.*
"Quality/Productivity Thrusts in Aerospace Manufacturing"
Thomas R. Rooney, *Vice President, Engineering and Advanced Development, Northrop Corporation*

"Both are Possible - No Matter the Age"

Wayne E. Meyer, *Rear Admiral, USN (Retired)*

Workshop A4: Encouraging Change

Chairman

Donald B. Rassier, *President, Ford Aerospace and Communications Corporation*

Speaker

"Changing Corporate Culture"

Lewis W. Springer, *Senior Vice President, Manufacturing, The Campbell Soup Company*

1:30 PM

Keynote Session B: "Reinforcing Productivity Growth"

Sanford N. McDonnell, *Chairman and Chief Executive Officer, McDonnell Douglas Corporation*

Session B: Measurement and Gainsharing

Workshop B1: White Collar Measurement

Chairman

Norman R. Augustine, *President and Chief Operating Officer, Martin Marietta Corporation*

Speakers

"The Langley Research Center Experience in Productivity Improvement"

Richard H. Petersen, *Director, NASA - Langley Research Center*

"How Good is Good? The Challenge of Measurement Beyond the Factory"

Matthew A. Sutton, *Senior Vice President, Avionics, Honeywell, Inc.*

"Quality and Productivity Initiatives in an Information Systems Environment"

Frederick F. Jenny, *Senior Vice President, Unisys, President, Unisys Defense Systems*

Workshop B2: Measurement Issues

Chairman

Thomas J. Murrin, *President, Energy and Advanced Technology Group, Westinghouse Electric Corporation*

Speaker

"How to Measure the Productivity of Management Personnel"

Paul A. Strassmann, *Vice President (Retired), Xerox Corporation*

Workshop B3: Gainsharing Experiences

Chairman

Katherine M. Bulow, *Assistant Secretary for Administration, U.S. Department of Commerce*

Speakers

"A Discussion of the Motorola Participative Management Program"

James R. Lincicome, *Executive Vice President and General Manager, Government Electronics Group, Motorola, Inc.*

“Gainsharing on the Joint STARS Program”

Albert J. Verderosa, *President, Melbourne Systems Division, Grumman Corporation*

“Success with Gainsharing Relies on Much More Than a Simple Formula”

William B. Potter, *Chairman and President, Preston Corporation*

Workshop B4: Successful Applications

Chairman

J. Michael Kelly, *Deputy Assistant of the Air Force for Manpower Resources and Military Personnel*

Speaker

“Gainsharing - Do You Really Think You're Interested?”

John D. Wolf, *Executive Vice President, Operations, McDonnell Aircraft Company*

4:20 PM

Closing Address

“Future Work Force Quality”

Andrew C. Sigler, *Chairman, Champion International Corporation*

Wednesday/3 December 1986

8:30 AM

Opening Address

“Management Creates the Culture that Makes the Difference”

David R. Braunstein, *General Co-Chairperson and Director of Productivity, Douglas Aircraft Company*

8:45 AM

“A Customer's Perspective of the Importance of Quality”

General John L. Piotrowski, *Vice Chief of Staff, United States Air Force*

Keynote Session C: “Participative Management Working in a Large Corporation”

Robert W. Galvin, *Chairman of the Board, Motorola, Inc.*

Session C: Participative Management

Workshop C1: Management Involvement

Chairman

John C. Bierwirth, *Chairman and Chief Executive Officer, Grumman Corporation*

Speakers

“Making It Happen at TRW”

Paul W. Mayhew, *Vice President and General Manager, Engineering and Test Division, TRW Space and Technology Group*

“Breathing New Life into Old Organizations”

Robert B. Young, Jr., *Vice President, Lockheed Corporation and President, Lockheed Engineering and Management Services Company, Inc.*

“People Power: Prescription for Positive Change”

Aris Melissaratos, *Vice President, Manufacturing, Defense and Electronics Systems Center, Westinghouse Electric Corporation*

Workshop C2: Management Style

Chairman

John J. Franke, Jr., *Assistant Secretary for Administration, U.S. Department of Agriculture*

Speaker

"A Participative Management Style that Works"

William F. Ballhaus, Jr., *Director, NASA Ames Research Center*

Workshop C3: Management Techniques

Chairman

John S. Toll, *President, University of Maryland*

Speakers

"Manufacturing's Future: Winners and Losers"

Ross L. Silberstein, *Vice President and Director of Manufacturing, Automotive Aftermarket Division, Sherwin-Williams Company*

"How to Overcome Bureaucracy and Tap the Strength of Your People"

F. Dale Robertson, *Associate Chief of Forest Service, U.S. Department of Agriculture*

"Quality Leadership: A Tool for Revitalization"

Anthony A. Cardinal, *Vice President, Textile Fibers, E.I. DuPont de Nemours and Company, Inc.*

Workshop C4: Cultural Change

Chairman

Daniel M. Tellep, *Group President, Lockheed Missiles and Space Company, Inc., Lockheed Corporation*

Speaker

"A New Creation of Things"

Alfred S. Warren, Jr., *Vice President, Industrial Relations, General Motors Corporation*

1:00 PM

Keynote Session D: "Quality and Productivity - An Attitude Not a Process"

David Packard, *Chairman of the Board, Hewlett-Packard Company*

Session D: Quality Ethic

Workshop D1: Managing the Process

Chairman

George A. Rodney, *Associate Administrator for Safety, Reliability, Maintainability, and Quality Assurance, NASA Headquarters*

Speakers

"U.S. Management - It Will Change - Like It or Not"

Larry F. Wright, *Vice President, Dow Chemical U.S.A. - Texas Operations*

"Perfect Build Team's: A Total Plant Participation in Quality and Productivity"

Larry A. Frame, *Vice President, Off-site Facilities, Litton Guidance and Control*

“Productivity Improvement Program”

Major General Jimmy D. Ross, *Commander, U.S. Army Depot System Command*

Workshop D2: Employee Participation

Chairman

William R. Hoover, *Chairman and President, Computer Sciences Corporation*

Speaker

“Continuous Quality Improvement is a Part of Every Manager’s Job”

Robert W. Hager, *Vice President, Boeing Aerospace Company and Space Station Program Manager*

Workshop D3: Meeting the Competitive Challenge

Chairman

George B. Merrick, *Vice President, Strategic Planning and Mission Analysis, North American Space Operations, Rockwell International Corporation*

Speakers

“Meeting the Technical and Competitive Quality Challenge”

Bernard L. Koff, *Senior Vice President, Engineering, Pratt and Whitney*

“Project Genesis - The Transition of a Company”

D. Travis Engen, *President and General Manager, ITT Avionics Division*

“Developing the Quality Ethic Through Total Organizational Commitment”

Richard C. Close, *Manager, Advanced Systems, Government Systems Division, Eastman Kodak Company and President, EKTRON Applied Imaging, A Subsidiary of Eastman Kodak Company.*

Workshop D4: Application for the Advocate

Chairman

General Richard H. Thompson, *Commander, U.S. Army Materiel Command*

Speaker

“How to Develop/Maintain Quality Focus in a Mature Organization”

Vincent N. Cook, *IBM Vice President and President, Federal Systems Division, IBM Corporation*

3:30 PM Closing Address/“Five Goals to Help Us Keep Competitive”

Senator Jeff Bingaman, *Democrat, New Mexico*

4:00 PM General Chairpersons Closing Remarks

Joyce R. Jarrett and **David R. Braunstein**

Appendix B

Acknowledgments

The papers and video presentations of the Symposium speakers were used as the basis for writing this report.

Numerous individuals deserve recognition for their work in organizing the four sessions and sixteen workshops of the Symposium: the Symposium Program Group Chairman, **David R. Braunstein**, Director of Productivity, Douglas Aircraft Company, McDonnell Douglas Aircraft Corporation; the Session Co-Managers **Saul R. Locke**, Director, Productivity, Martin Marietta Manned Space Systems, and **Gerard C. Hoffmann**, Productivity Principal for the Navy, U.S. Department of the Navy (Session A: Entrepreneurialism); **Edward G. Siebert**, Director, Corporate Productivity, Grumman Corporation and **Thomas C. Tuttle**, Director, Maryland Center for Productivity and Quality of Work Life, University of Maryland (Session B: Measurement and Gainsharing); **Robert B. Young, Jr.**, Vice President, Lockheed Corporation and President, Lockheed Engineering and Management Services Company, Inc. and **R. Wayne Young**, Director, Administration, NASA Lyndon B. Johnson Space Center (Session C: Participative Management); and **Scott L. Kaseburg**, Manager, Quality Improvement, Boeing Aerospace Company and Brigadier General **Frank Goodell**, Special Assistant for Reliability and Maintainability, United States Air Force (Session D: Quality Ethic). The four AIAA Session Coordinators: **Peter W. Wood**, Senior Vice President, Booz, Allen & Hamilton Inc. (A); **Gerald Geismar**, Director of Business Management, TRW Space and Technology Group (B); **John Taylor**, Director of Procurement, Military Aviation Division, Honeywell, Inc. (C); and **George J. Vlay**, Director, Product Assurance Office, Ford Aerospace and Communications Corporation (D). Our appreciation is extended to the workshop managers: **Robert L. Vaughn**, Director of Productivity, Lockheed Missiles and Space Company, Inc. (A1: Innovation); **Richard A. Walsh**, Division Quality/Productivity Programs, Space Systems Division, General Electric Company (A2: Constant Improvement); **Carl Zerambo**, Associate, Booz, Allen & Hamilton Inc. (A3: Intrapreneurialism); **David H. Carstater**, Productivity Advisor, Department of the Navy (A4: Encouraging Change); Lieutenant Colonel **Thomas S. Lanier**, Chief, Communications for Reliability and Maintainability, United States Air Force (B1: White Collar Measurement); **William L. Williams**, Productivity Officer, NASA Langley Research Center (B2: Measurement Issues); **Ginger Paul**, Division Productivity Administrator, Space Station Division, Rockwell International Corporation (B3: Gainsharing Experiences); **Mary E. Nickerson**, Business Manager, Space Manufacturing Laboratory, Hughes Aircraft Company (B4: Successful Applications); **M. Cynda Briley**, Chief, Productivity Plans and Investment Team, U.S. Army Materiel Command (C1: Management Involvement); **Peter W. Sivillo**, Senior Staff Scientist, The Singer Company, Link Flight Simulation Division, Space Programs Operations (C2: Management Style); **David Dallas, Jr.**, Business Planning Manager, Space Information Systems Operations, Ford Aerospace and Communications Corporation (C3: Management Techniques); **Herman E. Shipley**, Director, Service Programs, Lockheed Missiles and Space Company, Inc. (C4: Cultural Change); **Beverly A. Bedwell**, Associate Commissioner for Assessment, Social Security Administration (D1: Managing the Process); **William D. Bumgarner**, Vice President,

Engineering, Space Sciences Division, Computer Sciences Corporation (D2: Employee Participation); **George J. Vlay**, Director, Product Assurance Office, Ford Aerospace and Communications Corporation (D3: Meeting the Competitive Challenge); and **Lewis L. Peach, Jr.**, Assistant Director of Aerophysics for Scientific Computing, NASA Ames Research Center (D4: Application for the Advocate).

A number of people deserve special thanks for their extra efforts in consolidating and synthesizing the thoughts presented at the Symposium into the strategies and recommendations formulated for this report: **Barbara Moller**, Moller-Cochran Productions; **Leo Lunine**, Section Manager, and **Charlotte Marsh**, Editor, Jet Propulsion Laboratory; and **Arthur R. Barzelay**, Barzelay Engineering, **Ellwood J. Anaheim** and **Sally Stiles** of Maxima for proofing the manuscript.

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C. Robert Nysmith

IN MEMORIAM

NASA is saddened by the death of Ross L. Silberstein of the Sherwin Williams Company on June 13, 1987. Mr. Silberstein's participation in the Symposium as a panelist was valued and deeply appreciated by NASA.